

Appl. No. 10/510,417
Amdt. Dated February 10, 2009
Reply to Office Action of October 10, 2008

Amendments to the Claims:

This listing will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently amended): A piston pump ~~for a blood pressure measuring device~~ comprising:
a cylindrical cylinder having a cylinder head;
a piston reciprocating inside the cylinder and sliding on an inner wall of the cylinder;
a suction port through which gas is sucked into a pump chamber defined by the cylinder and the piston-passes; and
an exhaust port through which the gas is discharged from the pump chamber passes;
wherein the piston pump sucks the gas through the suction port and discharges the gas through the exhaust port as the volume of the pump chamber is changed by reciprocating motion of the piston;
wherein the suction port is arranged at a top of the piston with a suction valve, which opens as the volume of the pump chamber is increased, the piston having a hole at a center thereof in order to fix the suction valve;
wherein the exhaust port is arranged at a top of the cylinder with an exhaust valve, which

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opens when the volume of the pump chamber is decreases decreased; and

wherein the cylinder and the cylinder head are bonded by gluing, welding, and/or adhesion in an air tight manner; and

wherein an inner diameter of the cylinder is adaptedly formed not exceeding 20 mm such that the piston pump can be utilized in a blood pressure measuring device.

Claim 2 (Previously Presented) The piston pump according to claim 1, wherein the suction valve is arranged at a top face of the piston on a side of the pump chamber.

Claim 3 (Previously Presented) The piston pump according to claim 1, wherein the exhaust valve is umbrella-shaped and arranged at a top face of the top of the cylinder outside the pump chamber.

Claim 4 (Previously Presented) The piston pump according to claim 1, wherein the piston has an opening communicating with the suction port, wherein the opening is arranged outside the pump chamber so as to allow air sucked through the suction port into the pump chamber to pass and a plenum capable of storing the air to communicate with the opening;

wherein the plenum is encompassed by an enclosure having at least one plenum suction port; and

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wherein the enclosure is in a housing having a base portion fixed to the cylinder such that the base portion holds a motor.

Claim 5 (Currently Amended)

A piston pump including:

a cylindrical cylinder having a top portion;
a piston reciprocating inside the cylinder and sliding on an inner wall of the cylinder;
a suction port through which gas is sucked into a pump chamber defined on a side of by a side wall of the top portion of the cylinder, a side wall of the cylinder and a top face of the piston passes; and

an exhaust port through which the gas is discharged from the pump chamber passes;
wherein the piston pump sucks the gas from the suction port and discharges the gas through the exhaust port as a volume of the pump chamber is changed by reciprocating motion of the piston;

wherein the suction port is arranged at the top portion of the cylinder with a suction valve, which opens when the volume of the pump chamber is increased; and the exhaust port is arranged at the piston with an exhaust valve, which is umbrella-shaped and is arranged outside the pump chamber and opens when the volume of the pump chamber is decreased, the piston having a hole at a center thereof in order to fix the exhaust valve; and

wherein an inner diameter of the cylinder is adaptedly formed not exceeding 20 mm.

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Claim 6 (Previously Presented) The piston pump according to claim 5, wherein the suction valve is umbrella-shaped and arranged inside the pump chamber.

Claim 7 (Previously Presented) The piston pump according to claim 1, wherein the piston engages with a coupling member in such a manner that the coupling member is capable of turning in a circumferential direction thereof, and wherein the coupling member is ring-shaped and connected to a connecting member driven such that the engaged piston is reciprocated inside the cylinder.

Claim 8 (Original) The piston pump according to claim 7, wherein the piston comprises therein a recess portion formed continuously in the circumferential direction of the piston and engaged with the coupling member, the recess portion including at least a part of a first predetermined spherical surface; wherein the coupling member has a projection portion formed continuously in the circumferential direction such that the projection portion corresponds to the recess portion, the projection portion including at least a part of a predetermined second spherical surface to engage with the recess such that the projection portion is capable of turning in the circumferential direction and in an axial direction; and wherein the piston reciprocates when the projection portion and the recess portion engage with each other so as to transmit driving force from the connecting member to the piston.

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Claim 9 (Previously Presented) The piston pump according to claim 1, wherein at least a portion of the piston sliding on ~~an~~ the inner wall of the cylinder is composed of a self-lubricating material.

Claim 10 (Previously Presented) The piston pump according to claim 1, wherein the cylinder comprises a top plenum defined by a top enclosure fixed to the top portion of the cylinder and a motor housing fixed at a position spaced apart by a predetermined distance from the top portion such that the cylinder is connected and fixed to at least a part of the motor housing;

wherein the motor housing is composed of a base portion fixed to the cylinder such that the base portion holds a motor for driving the piston so as to reciprocate inside the cylinder and a cover portion disposed along the base portion such that the cover portion fastens the motor by sandwiching the motor with the base portion; and

wherein the cover portion and the base portion are engaged with a connecting mechanism capable of engagement and disengagement.

Claim 11 (Previously Presented) The piston pump according to claim 1, wherein the piston pump is connected to a blood pressure monitor.

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Claim 12 (Cancelled)

Claim 13 (Currently Amended) A method of producing a piston pump including a cylindrical cylinder, a piston reciprocating inside the cylinder; a suction port through which gas is sucked into a pump chamber defined by the cylinder and the piston ~~passes~~ and an exhaust port through which the gas is discharged from the pump chamber ~~passes~~; the method comprising the steps of:

producing a piston pump pre-assembly comprising the cylinder and a cylinder top portion in which the exhaust port is formed;

conducting a leakage inspection of the piston pump pre-assembly by measuring a change of a pressure pressurization; and

producing a piston pump by further assembling components to the piston pump pre-assembly.

Claim 14 (Cancelled)

Claim 15 (Currently Amended) A piston pump for a blood pressure measuring device comprising:

a cylindrical cylinder having a cylinder head;

a piston reciprocating inside the cylinder;

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a suction port through which gas is sucked into a pump chamber defined by the cylinder and the piston passes;

an exhaust port through which the gas is discharged from the pump chamber passes; and
a coupling member engaging the piston in such a manner that the coupling member is capable of turning in a circumferential direction thereof;

wherein the piston pump sucks the gas through the suction port and discharges the gas through the exhaust port as the volume of the pump chamber is changed by reciprocating motion of the piston;

wherein the suction port is arranged at a top of the piston with a suction valve, which opens as the volume of the pump chamber is increased;

wherein the exhaust port is arranged at a top of the cylinder with an exhaust valve, which opens when the volume of the pump chamber is decreases; and

wherein the coupling member is ring-shaped so as to have a hollow portion through
which air passes and connected to a connecting member driven such that the engaged piston is reciprocated inside the cylinder.

Claim 16 (Previously Presented) The piston pump according to claim 15, wherein the suction valve is arranged at a top face of the piston inside the pump chamber.

Claim 17 (Previously Presented) The piston pump according to claim 15, wherein the

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exhaust valve is umbrella-shaped and arranged at a top face of the top of the cylinder outside the pump chamber.

Claim 18 (Previously Presented) The piston pump according to claim 15,
wherein the piston has an opening communicating with the suction port,
wherein the opening is arranged outside the pump chamber so as to allow air sucked
through the suction port into the pump chamber to pass and a plenum capable of storing the air to
communicate with the opening;
wherein the plenum is encompassed by an enclosure having at least one plenum suction
port; and
wherein the enclosure is in a housing having a base portion fixed to the cylinder such that
the base portion holds a motor.